

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

REC'D 08 JUN 2005

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Applicant's or agent's file reference LU6084/Doe	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/14437	International filing date (day/month/year) 18.12.2003	Priority date (day/month/year) 20.12.2002
International Patent Classification (IPC) or both national classification and IPC C08F4/642, C08F210/16, C08L23/08		
Applicant BASELL POLYOLEFINE GMBH		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

I ☒ Basis of the opinion

II ☐ Priority

III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability



IV ☐ Lack of unity of invention

V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

VI ☐ Certain documents cited

VII ☐ Certain defects in the international application

VIII ☐ Certain observations on the international application

Date of submission of the demand 01.07.2004	Date of completion of this report 08.06.2005
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Parry, J Telephone No. +31 70 340-1032 <div style="text-align: right;">  </div>

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/14437

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-47 as originally filed

Claims, Numbers

1-14 as originally filed

Drawings, Figures

1-2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).
- (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	9,13,14
	No: Claims	1-8, 10-12
Inventive step (IS)	Yes: Claims	
	No: Claims	1-14
Industrial applicability (IA)	Yes: Claims	1-14
	No: Claims	

2. Citations and explanations

see separate sheet

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Re Item IV

Lack of unity of invention

Following decision W 0029/04 of 16 March 2004, no lack of unity exists for the present application.

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The following documents (D1-D5) will be referred to (see the ISR for the relevant passages):

D1 WO 01/12641 A (BASF AKTIENGESELLSCHAFT,
GERMANY) 22 February 2001 (2001-02-22)

D2 WO 01/12687 A (BASF AKTIENGESELLSCHAFT,
GERMANY) 22 February 2001 (2001-02-22)

D3 WO 01/96417 A (BASELL POLYOLEFINE
G.M.B.H., GERMANY)
20 December 2001 (2001-12-20)

D4 WO 01/92346 A (UNION CARBIDE CHEMICALS &
PLASTICS TECHNOLOGY CORP., USA)
6 December 2001 (2001-12-06)

D5 BRADLEY, SAM ET AL BRADLEY, SAM ET AL.
ORGANOMETALLICS , 21(16), 3443-3453 2002,

1. (i) D1 describes catalysts in the worked examples with a quinonyl function of the type Ind-(C6C3N)CrCl₂ (ie an indenyl ligand linked to a quinonyl function) used with MAO in

ethylene-hexene polymerisation. This chromium complex falls under those described in present claim 6, formula II wherein the group Z, which comprises R5a and R6a, is linked to R7a to form a 6-membered ring (see claim 6, p.50, l. 1-2), taking the broadest scope of this claim albeit in spite of a lack of clarity therein resulting from valency violations for this type of structure. Others types of ligation employing heterocycles such as pyrazine instead of quinonyl are also mentioned in the description, which fall under the ambit of the present claims. The skilled person would therefore seriously contemplate using such ligation where a cyclopentadienyl unit bridges to such heterocycles.

(ii) The copolymers described in D1 which are produced using these catalysts have the same parameters as those of the present application except for the CDBI parameter of present claim 1, about which D1 is silent. However, since the complexes of D1 and catalytic processes employing them are the same as those of the present application, it follows that the ethylene-hexene copolymers produced thereby must also be the same as those of the present application. The ethylene copolymers produced in D1 therefore anticipate those of the present application (see PCT GL-III, 4.7a).

Hence claims 1-8, 10-12 are not novel.

(iii) It is trivial to employ such catalysts in prepolymerisation, which is standard in the art, hence claim 9 is not inventive.

(iv) It is trivial to employ the so-produced copolymers in blends or fibres, films or moulds, which are standard products in the art, hence claims 13 and 14 are not inventive.

2. The same arguments applied to D1 under 1. (ii) do not apply to D2, as d2 discloses CDBI values of around 90% in examples 2 and 3, hence only claims 10-12 are not novel over D2.

3. The same arguments applied to D1 under 1. (ii) apply to D3 as far as seriously contemplating using the complexes as delineated in the description and claims is concerned, hence claim 7 is not novel.

4. D4 describes in example 5 the catalyst $\text{ind}-(\text{C}_6\text{C}_3\text{N})\text{CrCl}_2$, but employed in ethylene homopolymerisation only. Ethylene-hexene polymerisation with the

(Cp*-CH₂-pyridyl)CrCl₂ analogue does take place, but the product is shown by present comparative example 5, which employs the same chromium complex, under the experimental conditions employed therein not to be according to present claim 1 Hence claim 7 is not novel.

5.D5 (describes the use of (Cp-CH₂-pyridyl)CrCl₂ (cmpd 16) and MAO for ethylene homopolymerisation only, hence claims 7 and 10 are not novel.

Re Item VII

Certain defects in the international application

Comparative example 1 falls under present claim 7, so its role here is unclear.

Re Item VIII

Certain observations on the international application

The following objections are made under Art. 6 (PCT):

1. Claims 2 and 5: it is not clear to what extent the difference in branching chain length would have to be in order to constitute a clear classification of the polymer according to the term bi- or trimodal.
2. Claim 4: The term "crystaf" is unclear and furthermore requires cross-reference to other documentation (p.4, l.14-17).
3. Claim 5: "bimodal" appears redundant as it is already recited in claim 2, on which this claim depends.
4. Claim 6: (i) the link of L to a in (III) should have been defined by have a squiggle through it, as it presently represents a methyl group.

(ii) "C" cannot necessarily be distinguished from "D".

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5. Claim 7: point 3 applies here also.
6. Claim 9: it is not entirely clear what "mass" means here: atomic mass or weight?